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Dated: October 16, 2006 Signature: Valerie Cohen
(Valerie Cohen)

Docket No.: 495152000111
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Hui WANG

Application No.: 09/837,911 Confirmation No.: 9922

Filed: April 18, 2001 Art Unit: 1742

For: PLATING APPARATUS AND METHOD Examiner: W. Leader

APPEAL BRIEF

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This brief is in furtherance of the Notice of Appeal, filed in this case on May 15, 2006.

The fees required under § 1.17(f) and any required petition for extension of time for filing this brief and fees therefor, are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief contains items under the following headings as required by 37 C.F.R. § 41.37 and M.P.E.P. § 1205:

I.	Real Party in Interest
II	Related Appeals and Interferences
III.	Status of Claims
IV.	Status of Amendments
V.	Summary of Claimed Subject Matter
VI.	Grounds of Rejection to be Reviewed on Appeal

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VII.	Argument
VIII.	Claims Appendix
IX.	Evidence Appendix
X.	Related Proceedings Appendix
Appendix A	Claims

I. REAL PARTY IN INTEREST

The real party in interest for this appeal is:

ACM Research, Inc. of Fremont, California.

II. RELATED APPEALS, INTERFERENCES, AND JUDICIAL PROCEEDINGS

There are no other appeals, interferences, or judicial proceedings that will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

A. Total Number of Claims in Application

There are 44 claims pending in the application.

B. Current Status of Claims

1. Claims canceled: 1-109, 130-132, and 153-155.
2. Claims withdrawn from consideration but not canceled: 0.
3. Claims pending: 110-129, 133-152, and 156-159.
4. Claims allowed: 0.
5. Claims rejected: 110-129, 133-152, and 156-159.
6. Claims objected to: 0.

C. Claims on Appeal

The claims on appeal are claims 110-129, 133-152, and 156-159.

IV. STATUS OF AMENDMENTS

No Amendments remain outstanding.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Claim 110 is directed to a method for plating a film to a desired thickness on a surface of a substrate. (Page 4, lines 28-30; FIGS. 3A and 3B.) A plurality of stacked plating modules and a substrate transferring mechanism are provided. (Page 7, lines 5-17; FIGS. 52–57.) A substrate from a substrate holder is picked up with the substrate transferring mechanism. (Page 7, lines 5-17; FIGS. 52 – 57.) The substrate is loaded into a first one of the stacked plating modules with the substrate transferring mechanism. (Page 7, lines 5-17; FIGS. 52–57.) The substrate is positioned within a bath in the first one of the stacked plating modules. (Page 7, lines 5-17; FIGS. 52–57.) The bath is divided by a first wall and at least a second wall. (Page 25, lines 30-33; FIGS. 3A and 3B.) The first wall is adjacent to a first portion of the substrate and the at least second wall is adjacent to at least a second portion of the substrate when the substrate is positioned within the bath. (Page 26, lines 4-6; FIGS. 3A and 3B.) The first portion and the second portion are portions of the same surface on the substrate. (Page 4, lines 32-34; FIGS. 3A and 3B.) The film is plated to the desired thickness on the first portion of the substrate in the first one of the stacked plating modules. (Page 4, lines 28-30; FIGS. 3A and 3B.) After the film is plated on the first portion of the substrate, the film is plated to the desired thickness on the at least second portion of the substrate in the first one of the stacked plating modules. (Page 4, lines 30-32; FIGS. 3A and 3B.) The second portion is at a different radial location than the first portion. (Page 28, lines 8-15; FIGS. 3A, and 9A-9D.)

Claim 113 is directed to an automated tool for plating a film on a substrate, the substrate being a semiconductor wafer. (Page 54, lines 6-18; FIGS. 52-57.) The automated tool of claim 113 includes at least two plating baths positioned in a stacked relationship. (Page 54, lines 9-11; FIGS. 52-57.) Each of the at least two plating baths is divided by a first wall and at least a second wall.

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(Page 25, lines 30-33; FIGS. 3A and 3B.) Each of the at least two plating baths includes a first anode adjacent to the first wall and a second anode adjacent to the at least second wall. (Page 25, lines 30-33; FIGS. 3A and 3B.) The first and second anodes are connected to a first power supply and a second power supply, respectively. (Page 25, lines 33-34; FIGS. 3A and 3B.) The first and second power supplies are configured to alternate in providing power to the first and second anodes, respectively. (Page 26, lines 29-33.) The automated tool of claim 113 also includes at least one substrate holder. (Page 7, lines 5-17; FIGS. 52–57.) The automated tool of claim 113 also includes a substrate transferring mechanism. (Page 7, lines 5-17; FIGS. 52–57.) The automated tool of claim 113 also includes a frame supporting the plating baths, the substrate holder, and the substrate transferring mechanism. (Page 7, lines 5-17; FIGS. 52–57.) The automated tool of claim 113 also includes a control system in communication with the substrate transferring mechanism, the substrate holder, and the plating baths configured to continuously perform film deposition on the substrate. (Page 7, lines 15-17; FIGS. 52-57.)

Claim 142 is directed to a tool for plating a metal film on a substrate, the substrate being a semiconductor wafer. (Page 54, lines 6-18; FIGS. 52-57.) The tool of claim 142 includes a first plating module. (Page 7, lines 5-7; FIGS. 52-57.) The first plating module includes a bath divided by a first wall and at least a second wall. (Page 25, lines 30-33; FIGS. 3A and 3B.) The first plating module includes a first anode adjacent to the first wall. (Page 25, lines 30-33; FIGS. 3A and 3B.) The first plating module also includes a second anode adjacent to the at least second wall. (Page 25, lines 30-33; FIGS. 3A and 3B.) The first plating module also includes a substrate holder. (Page 7, lines 5-17; FIGS. 52–57.) The tool of claim 142 also includes a first power supply connected to the first anode. (Page 25, lines 33-34; FIGS. 3A and 3B.) The tool of claim 142 also includes a second power supply connected to the second anode. (Page 25, lines 33-34; FIGS. 3A and 3B.) The first and second power supplies are configured to alternate in providing power to the first and second anodes, respectively. (Page 26, lines 29-33.) The tool of claim 142 also includes at least a second plating module positioned in a stacked relationship with the first plating module. (Page 7, lines 5-17; FIGS. 52–57.) The tool of claim 142 also includes a substrate transferring

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mechanism that transfers the substrate between the substrate holder, the first plating module, and the at least second plating module. (Page 7, lines 5-17; FIGS. 52–57.)

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Whether claims 110, 119, 122, 123, 127, and 129 are patentable under 35 U.S.C. 103(a) over U.S. Patent No. 6,176,667 (the Fairbairn reference) in view of Japanese patent publication 04-311591 (the Hirohiko reference).

B. Whether claims 111, 112, 124-126 are patentable under 35 U.S.C. 103(a) over the Fairbairn reference in view of the Hirohiko reference and U.S. Patent No. 5,882,498 (the Dubin reference).

C. Whether claims 120 and 121 are patentable under 35 U.S.C. 103(a) over the Fairbairn reference in view of the Hirohiko reference and U.S. Patent No. 5,522,975 (the Andricacos reference).

D. Whether claim 128 is patentable under 35 U.S.C. 103(a) over the Fairbairn reference in view of the Hirohiko reference and U.S. Patent No. 5,925,227 (the Kobayashi reference).

E. Whether claims 113, 115-116, 118, 137, and 141-143 are patentable under 35 U.S.C. 103(a) over the Fairbairn reference in view of the Hirohiko reference and further in view of U.S. Patent No. 3,880,725 (the Van Raalte reference) or U.S. Patent No. 5,326,455 (the Kubo reference).

F. Whether claims 114, 138, 139, 144-150 are patentable under 35 U.S.C. 103(a) over the Fairbairn reference in view of the Hirohiko reference and further in view of the Van Raalte reference or the Kubo reference and the Dubin reference.

G. Whether claim 117 is patentable under 35 U.S.C. 103(a) over the Fairbairn reference in view of the Hirohiko reference and further in view of the Van Raalte reference or the Kubo reference and U.S. Patent No. 6,477,440 (the Davis reference).

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H. Whether claim 140 is patentable under 35 U.S.C. 103(a) over the Fairbairn reference in view of the Hirohiko reference and further in view of the Van Raalte reference or the Kubo reference and the Kobayashi reference.

I. Whether claims 151 and 152 are patentable under 35 U.S.C. 103(a) over the Fairbairn reference in view of the Hirohiko reference and further in view of the Van Raalte reference or the Kubo reference and the Dubin reference and the Kobayashi reference.

J. Whether claims 133-135 and 156-158 are patentable under 35 U.S.C. 103(a) over the Fairbairn reference in view of the Hirohiko reference and further in view of the Van Raalte reference or the Kubo reference and the Andricacos reference.

K. Whether claims 136 and 159 are patentable under 35 U.S.C. 103(a) over the Fairbairn reference in view of the Hirohiko reference and further in view of the Van Raalte reference or the Kubo reference and the Andricacos reference and the Electroplating Engineering Handbook.

VII. ARGUMENT

A. <u>Claims 110, 119, 122, 123, 127, and 129</u>

Claims 110, 119, 122, 123, 127, and 129 were rejected under 35 U.S.C. 103(a) as being unpatentable over the Fairbairn reference in view of the Hirohiko reference.

Independent claim 110 recites, in part, that after plating the film on the first portion of the substrate surface to the desired thickness, the film on the at least second portion of the substrate surface is plated to the desired thickness. Additionally, claim 110 recites that the first and the second portions of the substrate surface are each at a different radial location. Applicant asserts that the combination of the Fairbairn reference and the Hirohiko reference does not disclose or suggest these claim limitations.

1. **Examiner's definition of "desired thickness" is unreasonable**

In rejecting claim 110, the Examiner defined "desired thickness" to include any thickness between the initial deposition thickness and the final thickness. Thus, the Examiner's definition of "desired thickness" is "any thickness." Applicant asserts that this definition is unreasonable because it essentially reads out the adjective "desired" from the phrase "desired thickness." Applicant asserts that the ordinary meaning of "desired thickness" is a thickness that is wanted. Thus, the Examiner's definition of "desired thickness" as any thickness is contrary to ordinary meaning.

2. **Examiner's argument with respect to Hirohiko is based on inherency**

Applicant has asserted that the metal film in the Hirohiko reference is plated across the entire surface of the wafer at one time. The Examiner has not refuted this argument. Instead, the Examiner has asserted, "[b]ecause control may no[t] be sufficiently precise to obtain perfectly uniform deposition at all radial position, the second portion may be plated at a slightly slower rate than the first portion." The Examiner further asserts, "[i]n this case, as deposition across the entire substrate continues, the second portion reached the desired thickness at some time after the first portion as recited."

The Examiner has failed to cite to explicit disclosure from the Hirohiko reference to support the Examiner's assertion that different plating rates are used to plate different portions of the metal film. Thus, Applicant asserts that the Examiner is relying upon inherency. MPEP 2112(IV) explicitly states that inherency is not established by "the mere fact that a certain thing may result from a given set of circumstances." Instead, to establish inherency, MPEP 2112(V) states, "the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic <u>necessarily flows</u> from the teachings of the applied art." (Emphasis added).

Applicant asserts that it does not necessarily flow from the teachings of the Hirohiko reference that the metal film formed in the Hirohiko reference is plated at different rates such that

one portion reaches a "desired thickness" after another portion. (Note, the Examiner's assertion relies upon the Examiner's definition of "desired thickness" as being any thickness. As set forth above, Applicant asserts that this definition is unreasonable and contrary to ordinary meaning.) Instead, Applicant asserts that the teachings of the Hirohiko reference supports maintaining a uniform plating rate across the entire surface by regulating the amount of plating solution to form a plating film with precisely uniform film thickness.

In particular, the Hirohiko reference specifically states the purpose of the invention as obtaining "a plating film **precisely uniform** in film quality, composition and **film thickness**." (Emphasis added.) Additionally, the Hirohiko reference discloses regulating the amount of plating solution flowing from the concentric cylindrical spaces 123 onto the surface of the sample to increase from the center towards the outer cylindrical spaces 123.

Even if the precisely uniform film thickness stated as being the purpose of the Hirohiko reference can be achieved using different plating rates for different portions of the metal film as asserted by the Examiner, Applicant asserts that the Examiner must establish that using different plating rates **necessarily flows** from the teachings of the Hirohiko reference rather than merely that it is possible.

Additionally, if the Examiner is relying on common knowledge or taking official notice to support Examiner's assertion that the metal film in the Hirohiko reference is plated using different plating rates for different portions of the metal film, then Applicant request Examiner provide supporting documentary evidence. In particular, MPEP 2144.03 states, "[o]fficial notice unsupported by documentary evidence should only be taken by the examiner where the facts asserted to be well-known, or to be common knowledge in the art are capable of **instant and unquestionable demonstration** as being well-known." (Emphasis added.)

In the present case, Applicant asserts that it can not be instantly and unquestionably demonstrated that the metal film in the Hirohiko reference is plated using different plating rates for different portions of the metal film. Indeed, Applicant asserts that the disclosure in the Hirohiko

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reference of regulating the amount of plating solution flowing from the center to the outer surface of the sample suggests that any variation in the polishing rate from the center to the outer surface can be controlled to maintain a uniform polishing rate and to achieve a uniform film thickness from the center to the outer surface.

Thus, Applicant asserts that claim 110 is allowable over the combination of the Fairbairn reference and the Hirohiko reference. Additionally, Applicant asserts that claims 119, 122, 123, 127, and 129, which depend from claim 110, are allowable for at least the reason that they depend from an allowable independent claim.

B. <u>Claims 111, 112, 124-126</u>

Claims 111, 112, 124-126 were rejected under 35 U.S.C. 103(a) over the Fairbairn reference in view of the Hirohiko reference and the Dubin reference. Applicant asserts that these claims are allowable for at least the reason that they depend from an allowable independent claim.

C. <u>Claims 120 and 121</u>

Claims 120 and 121 were rejected under 35 U.S.C. 103(a) over the Fairbairn reference in view of the Hirohiko reference and the Andricacos reference. Applicant asserts that these claims are allowable for at least the reason that they depend from an allowable independent claim.

D. <u>Claim 128</u>

Claim 128 was rejected under 35 U.S.C. 103(a) over the Fairbairn reference in view of the Hirohiko reference and the Kobayashi reference. Applicant asserts that this claim is allowable for at least the reason that it depends from an allowable independent claim.

E. <u>Claims 113, 115-116, 118, 137, and 141-143</u>

Claims 113, 115-116, 118, 137, and 141-143 were rejected under 35 U.S.C. 103(a) as being unpatentable over the Fairbairn reference in view of the Hirohiko reference, and further in view of the Van Raalte reference or the Kubo reference.

1. **The Van Raalte reference does not disclose a second anode as recited in claims 113 and 142**

Independent claims 113 and 142 recite, in part, that the first and second anodes are connected to the first and second power supplies, respectively. Applicant asserts that the Van Raalte reference does not disclose the above claim limitation, because Van Raalte does not disclose a second anode as recited in the claims. In Van Raalte, the first and only anode is the body 14 of plating material. The Examiner mischaracterized the modifying electrode 16, which is a cathode, as the second anode.

The Van Raalte reference discloses an apparatus and a method for obtaining a metal film having a predetermined thickness profile on a surface of an article (article 12 in FIG. 1 and article 112 in FIG. 2). The Van Raalte reference states that "[t]he electrical potential is adjusted in such a manner that the article 12 is negative with respect to the body 14 of plating material. The difference in electrical potential between the body 14 and the article 12 causes the positive nickel ions to migrate through the electroplating solution 18 toward the article 12." (Column 3, lines 15-21.) Since **positive ions are drawn away from the body 14 of plating material**, the Examiner correctly characterized the body 14 of plating material as a **first anode** connected to a power supply.

By contrast, the Examiner's characterization of the modifying electrode 16 as a second anode is erroneous. The reference states that "[v]arying the electrical potential of the article 12 and the modifying electrode 16 permits the ions that would normally migrate toward the article 12 to be selectively drawn toward the modifying electrode 16." (Column 3, lines 29-33.) Since **positive ions are drawn toward the modifying electrode 16 rather than away from it**, the modifying electrode 16 acts as a cathode rather than an anode. Therefore, Applicant asserts that the Van Raalte reference does not disclose a second anode as recited in claims 113 and 142.

2. **The Examiner's suggested modification of the Van Raalte and Kubo references would change the basic principles under which the references were designed to operate**

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Independent claims 113 and 142 further recite, in part, that the first and second power supplies are configured to <u>**alternate in providing power**</u> to the first and second anodes, respectively.

In the Final Office Action, the Examiner stated that configuring the power supplies to alternate in providing power to the first and second anodes is a functional limitation related to the manner in which the power supplies are operated. The Examiner further stated: "By simply operating the on-off switches on the power supplies of Van Raalte and Kubo, power may be alternately provided to first and second anodes. Alternatively, the power supplies could be selectively disconnected from their source of power, e.g., unplugging from a wall outlet."

Applicant asserts that the Van Raalte and Kubo references do not disclose the requisite motivation to configure the power supplies to alternate in providing power to the first and second anodes, as recited in claims 113 and 142. In particular, modifying the Van Raalte and Kubo references in such a manner would change their principle of operation.

"If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious." M.P.E.P. § 2143.01, paragraph VI (citing *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959)). The *Ratti* court reversed a 35 U.S.C. 103 rejection, holding that the "suggested combination of references would require a substantial reconstruction and redesign of the elements shown in [the primary reference] as well as a change in the basic principle under which the [primary reference] construction was designed to operate." *Id.* (citing *In re Ratti*, 270 F.2d at 813, 123 USPQ at 352).

The Van Raalte reference, as shown earlier, operates with a single anode. Therefore, as in *Ratti*, the suggested modification (configuring power supplies to alternate in providing power to the first and second anodes) would require a second anode and substantial redesign of the elements shown in Van Raalte, as well as a change in the basic principle under which the Van Raalte construction was designed to operate.

With regard to the Kubo reference, as shown in FIGS. 3 and 4, the electrolytic copper foil is produced by passing a stream of electrolyte through a space between a rotating cathode drum 11 and an anode facing the drum, thus allowing gradual electrodeposition of copper on the cathode drum surface. (Column 5, line 66 to column 6, line 2.) The reference states that the anode is divided into two parts for separate functions; the main anode 13 is for forming the basic thickness of a foil and the sub-anodes 14 are for uniformizing the thickness. (Column 3, lines 27-32.) The reference further states that "[t]he **main anode** is supplied with electricity at a **uniform current density** throughout the entire width." (Emphasis added; column 3, lines 33-38). Furthermore, "[t]he main rectifier 15 **maintains a given current** between the cathode drum 11 and the main anodes 13," and "[t]he **main anodes** are supplied with a given **constant quantity of electricity** at a current density D (A/dm^2)." (Emphasis added; column 7, lines 5-6, and column 8, lines 14-15.) Therefore, interrupting the power supply to the main anodes 13 in order to alternate the power between the anodes would change the basic principle under which the Kubo construction was designed to operate.

For the forgoing reasons, Applicant asserts that the teachings of the Van Raalte or the Kubo reference are not sufficient to render claims 113 and 142 *prima facie* obvious. Thus, Applicant asserts that independent claims 113 and 142 are allowable. Additionally, Applicant asserts that claims 115, 116, 118, 137, and 141, which depend from claim 113, and claim 143, which depends from claim 142, are allowable for at least the reason that they depend from allowable independent claims.

F. Claims 114, 138, 139, 144-150

Claims 114, 138, 139, 144-150 were rejected under 35 U.S.C. 103(a) over the Fairbairn reference in view of the Hirohiko reference and further in view of the Van Raalte reference or the Kubo reference and the Dubin reference. Applicant asserts that these claims are allowable for at least the reason that they depend from an allowable independent claim.

G. Claim 117

Claim 117 was rejected under 35 U.S.C. 103(a) over the Fairbairn reference in view of the Hirohiko reference and further in view of the Van Raalte reference or the Kubo reference and the Davis reference. Applicant asserts that this claim is allowable for at least the reason that it depends from an allowable independent claim.

H. Claim 140

Claim 140 was rejected under 35 U.S.C. 103(a) over the Fairbairn reference in view of the Hirohiko reference and further in view of the Van Raalte reference or the Kubo reference and the Kobayashi reference. Applicant asserts that this claim is allowable for at least the reason that it depends from an allowable independent claim.

I. Claims 151 and 152

Claims 151 and 152 were rejected under 35 U.S.C. 103(a) over the Fairbairn reference in view of the Hirohiko reference and further in view of the Van Raalte reference or the Kubo reference and the Dubin reference and the Kobayashi reference. Applicant asserts that these claims are allowable for at least the reason that they depend from an allowable independent claim.

J. Claims 133-135 and 156-158

Claims 133-135 and 156-158 were rejected under 35 U.S.C. 103(a) over the Fairbairn reference in view of the Hirohiko reference and further in view of the Van Raalte reference or the Kubo reference and the Andricacos reference. Applicant asserts that these claims are allowable for at least the reason that they depend from an allowable independent claim.

K. Claims 136 and 159

Claims 135 and 159 were rejected under 35 U.S.C. 103(a) over the Fairbairn reference in view of the Hirohiko reference and further in view of the Van Raalte reference or the Kubo reference and the Andricacos reference and the Electroplating Engineering Handbook. Applicant

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asserts that these claims are allowable for at least the reason that they depend from an allowable independent claim.

L. <u>Conclusion</u>

For the forgoing reasons, Applicant requests reversal of the Examiner's rejections of claims 110-129, 133-152, and 156-159.

VIII. CLAIMS APPENDIX

A list of the claims involved in the present appeal is attached hereto as Appendix A.

IX. EVIDENCE APPENDIX

No evidence pursuant to §§ 1.130, 1.131, or 1.132 or entered by or relied upon by the Examiner is being submitted.

X. RELATED PROCEEDINGS APPENDIX

No related proceedings are referenced above, or copies of decisions in related proceedings are not provided, hence no Appendix is included.

Dated: October 16, 2006

Respectfully submitted,

By ______________________

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APPENDIX A

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Claims involved in the Appeal of Application Serial No. 09/837,911

Claims 1-109 (Canceled).

110. A method for plating a film to a desired thickness on a surface of a substrate, comprising:

providing a plurality of stacked plating modules and a substrate transferring mechanism;

picking up a substrate from a substrate holder with the substrate transferring mechanism;

loading the substrate into a first one of the stacked plating modules with the substrate transferring mechanism;

positioning the substrate within a bath in the first one of the stacked plating modules, the bath divided by a first wall and at least a second wall, wherein the first wall is adjacent to a first portion of the substrate and the at least second wall is adjacent to at least a second portion of the substrate when the substrate is positioned within the bath, wherein the first portion and the second portion are portions of the same surface on the substrate;

plating the film to the desired thickness on the first portion of the substrate in the first one of the stacked plating modules; and

after plating the film on the first portion of the substrate, plating the film to the desired thickness on the at least second portion of the substrate in the first one of the stacked plating modules, wherein the second portion is at a different radial location than the first portion.

111. The method of claim 110, further comprising:

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after plating the film on the substrate, drying the substrate by at least one of spinning the substrate or directing drying gas onto the substrate.

112. The method of claim 110, wherein at least a second one of the plurality of plating modules is a cleaning module, the method further comprising:

after plating the film on the substrate, picking up the substrate with the substrate transferring mechanism from the first one of the stacked plating modules;

placing the substrate into the second one of the stacked plating modules for cleaning;

cleaning the substrate in the second one of the stacked plating modules; and

drying the substrate in the second one of the stacked plating modules.

113. An automated tool for plating a film on a substrate, the substrate being a semiconductor wafer, comprising:

at least two plating baths positioned in a stacked relationship, wherein each of the at least two plating baths is divided by a first wall and at least a second wall, wherein each of the at least two plating baths includes a first anode adjacent to the first wall and a second anode adjacent to the at least second wall, wherein the first and second anode are connected to a first power supply and a second power supply, respectively, and wherein the first and second power supplies are configured to alternate in providing power to the first and second anodes, respectively;

at least one substrate holder;

a substrate transferring mechanism;

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a frame supporting said plating baths, said substrate holder and said substrate transferring mechanism; and

a control system in communication with said substrate transferring mechanism, substrate holder and said plating baths configured to continuously perform uniform film deposition on the substrate.

114. The automated tool of claim 113, further comprising:

at least two cleaning modules positioned in a stacked relationship with said at least two plating baths.

115. The automated tool of claim 113, wherein the substrate transferring mechanism includes a telescoping member movable with three degrees of freedom.

116. The automated tool of claim 113, wherein said substrate transferring mechanism is mounted on a bottom portion of said frame.

117. The automated tool of claim 113, wherein said substrate transferring mechanism is mounted on a top portion of said frame.

118. The automated tool of claim 113, further comprising at least a second set of plating baths positioned in a stacked relationship and at least two additional cleaning modules positioned in a stacked relationship with said second set of plating baths.

119. The method of claim 110, wherein plating a film on the substrate comprises:

flowing an electrolyte in a gap formed between the first wall and the first portion of the substrate to plate a film on the first portion of the substrate; and

flowing the electrolyte in a gap formed between the at least second wall and the at least second portion of the substrate to plate a film on the at least second portion of the substrate.

120. The method of claim 119, further comprising:

supplying the electrolyte to the bath using a plumbing box.

121. The method of claim 120, wherein the plumbing box includes:

a pump;

valves;

filters; and

plumbing connections.

122. The method of claim 119, wherein plating a film on the substrate comprises:

applying a charge to the electrolyte flowing in the gap formed between the first wall and the first portion of the substrate using a first anode adjacent to the first wall; and

applying a charge to the electrolyte flowing in the gap formed between the at least second wall and the at least second portion of the substrate using at least a second anode adjacent to the at least second wall.

123. The method of claim 122, wherein the first anode and the at least second anode are connected to a power supply.

124. The method of claim 110, wherein plating a film on the substrate comprises:

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plating a seed layer on a dielectric layer on the substrate in the first one of the stacked plating modules.

125. The method of claim 124, further comprising:

after plating the seed layer on the dielectric layer on the substrate, transferring the substrate into at least a second one of the plurality of plating modules; and

plating a metal film on the seed layer in the at least second one of the plurality of plating modules.

126. The method of claim 125, wherein the first one of the stacked plating modules and the at least second one of the plurality of plating modules use different electrolyte or plating hardware.

127. The method of claim 110, further comprising:

rotating the substrate within the bath.

128. The method of claim 110, further comprising:

moving the substrate holder in a vertical direction to match the vertical position of the substrate transferring mechanism.

129. The method of claim 110, further comprising:

moving the substrate transferring mechanism in a horizontal direction.

130-132 (Canceled).

133. The automated tool of claim 113, further comprising:

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an electrolyte tank; and

a plumbing box connected to the electrolyte tank and to the at least two plating baths to supply electrolyte to the at least two plating baths from the electrolyte tank.

134. The automated tool of claim 133, wherein the plumbing box includes:

a pump;

valves;

filters; and

plumbing connections.

135. The automated tool of claim 133, wherein the electrolyte flows in a gap formed between the first wall and the first portion of the substrate to plate a film on the first portion of the substrate, and wherein the electrolyte flows in a gap formed between the at least second wall and the at least second portion of the substrate to plate a film on the at least portion of the substrate.

136. The automated tool of claim 133, wherein the electrolyte tank includes a temperature control.

137. The automated tool of claim 113, further comprising:

at least two drivers, wherein a driver rotates or oscillates the substrate over a plating bath.

138. The automated tool of claim 113, wherein the at least two plating baths includes:

a first plating bath to plate a seed layer on a dielectric layer on the substrate; and

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a second plating bath to plate a metal film on the seed layer, wherein the substrate transferring mechanism transfers the substrate from the first plating bath to the second plating bath after the seed layer is plated on the dielectric layer on the substrate.

139. The automated tool of claim 138, wherein the first plating bath and the second plating bath use different electrolyte or plating hardware.

140. The automated tool of claim 113, wherein the substrate holder moves in a vertical direction.

141. The automated tool of claim 113, wherein the substrate transferring mechanism moves in a horizontal direction.

142. A tool for plating a metal film on a substrate, the substrate being a semiconductor wafer, comprising:

a first plating module having:

a bath divided by a first wall and at least a second wall;

a first anode adjacent to the first wall;

a second anode adjacent to the at least second wall; and

a substrate holder;

a first power supply connected to the first anode;

a second power supply connected to the second anode, wherein the first and second power supplies are configured to alternate in providing power to the first and second anodes, respectively;

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at least a second plating module positioned in a stacked relationship with the first plating module; and

a substrate transferring mechanism that transfers the substrate between the substrate holder, the first plating module, and the at least second plating module.

143. The tool of claim 142, wherein the first plating module includes a driver to rotate or oscillate the substrate over the bath.

144. The tool of claim 142, wherein the substrate transferring mechanism transfers the substrate into the first plating module to plate a seed layer on a dielectric layer on the substrate, then transfers the substrate into the at least second plating module to plate a metal film layer on the seed layer.

145. The tool of claim 144, wherein the first plating module and the at least second plating module use different electrolyte or plating hardware.

146. The tool of claim 142, further comprising:

a first cleaning module, wherein the substrate transferring mechanism transfers the substrate from the first plating module or the second plating module to the first cleaning module to clean the substrate.

147. The tool of claim 146, wherein the first cleaning module is positioned in a stacked relationship with the first plating module and the at least second plating module.

148. The tool of claim 146, further comprising:

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at least a second cleaning module positioned in a stacked relationship with the first cleaning module, wherein the first cleaning module and the at least second cleaning module are positioned adjacent to the first plating module and the at least second plating module.

149. The tool of claim 148, wherein the substrate transferring mechanism:

transfers a first substrate from the substrate holder to the first plating module to be plated,

transfers a second substrate from the substrate holder to the second plating module to be plated,

after the first substrate is plated, transfers the first substrate from the first plating module to the first cleaning module to be cleaned, and

after the second substrate is cleaned, transfers the second substrate from the second plating module to the second cleaning module to be cleaned.

150. The tool of claim 149, wherein the substrate transferring mechanism moves in a vertical direction to move between the first plating module and the at least second plating module.

151. The tool of claim 150, wherein the substrate holder moves in a vertical direction to match the vertical position of the substrate transferring mechanism.

152. The tool of claim 149, wherein the substrate transferring mechanism moves in a horizontal direction to move between the first plating module and the first cleaning module.

153-155 (Canceled).

156. The tool of claim 142, further comprising:

an electrolyte tank; and

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a plumbing box connected to the electrolyte tank and to the first plating module to supply electrolyte to the bath from the electrolyte tank.

157. The tool of claim 156, wherein the plumbing box includes:

a pump;

valves;

filters; and

plumbing connections.

158. The tool of claim 156, wherein the electrolyte flows in a gap formed between the first wall and the first portion of the substrate to plate a film on the first portion of the substrate, and wherein the electrolyte flows in a gap formed between the at least second wall and the at least second portion of the substrate to plate a film on the at least portion of the substrate.

159. The tool of claim 156, wherein the electrolyte tank includes a temperature control.

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